

from 29 per cent to 42 per cent, the mean temperature being 67°. Both of these degrees of humidity are much too low according to the results obtained from a study of pneumonia, operations, and deaths in general. Furthermore the children were subjected to the slightly humidified air only about 24 hours per week, while during the other 144 they lived under the same conditions as did the children who were in the drier room. A difference of 1 or 2 per cent in health could scarcely be expected to be evident in mental achievement, especially in view of the fact that the gradings depended upon only a single examination. One child with a cold would be enough to upset the entire result.

The question of the practicability of humification is of great importance. In many places it is to-day impracticable to have the degree of humidity which would seem to be desirable. That, however, is no reason for giving up the attempt. If we need greater humidity within our houses for the sake of health, the thing to do is to devise new methods of obtaining it. Double windows, for example, make a great difference in this respect; so, too, do proper air spaces within walls. In conclusion, a word should be said about the physiological effect of going from a warm room with fairly high humidity to the cold outside air in winter. I, too, like Mr. Kincer, supposed at one time that this was injurious. In order to test the matter, however, I made inquiries among greenhouse men who, more than almost any others, are subject to such changes. To my surprise I was repeatedly met by the most positive statement that greenhouse men feel no ill effects from going from the warm, moist greenhouse air to the cold air outdoors, especially when the greenhouses are kept near the ideal temperature, say at 65°. This point, like many of those discussed here, opens another great field where our knowledge is slight and where much further study is needed.—E. H.

RELATIONS BETWEEN THE METEOROLOGICAL ELEMENTS AND THE NUMBER OF DEATHS FROM INFLAMMATORY DISEASES OF THE RESPIRATORY ORGANS, AT PARIS.

By LOUIS BESSON.

[Abstracted from *Comptes Rendus* (Paris Acad.), Oct. 11, 1920, pp. 686-688.]

Having drawn upon the *Bulletin hebdomadaire de statistique municipale* for figures regarding the number of deaths from diseases of the respiratory organs, the author has studied them in relation to the daily and weekly means of the principal meteorological elements as determined at the Montsouris Observatory. The diseases considered were acute bronchitis, chronic bronchitis, pneumonia, broncho-pneumonia, pulmonary congestion, and other affections of the respiratory apparatus, with the exception of phthisis. The record covers the 10 years 1904-1913, or 522 weeks.

Evaluating the population of Paris at 2,784,000 during the period in question, he finds that there was a weekly average of 142 deaths from these causes, but there is a marked annual variation. There is a maximum in the middle of February and a minimum at the beginning of September. There is a secondary maximum in the middle of April and a secondary minimum in the middle of March. There is a marked relation between the antepenultimate weekly mean of temperature and these deaths, the one curve being the inverse of the other. There is also a direct relation between the number of days of the week preceding the death upon which there were winds from the NNE. to E. and the deaths. Considering

these two factors of temperature and wind direction, it is possible to eliminate their effects and determine a seasonal curve. When this is done, it is found that the first six months of the year have more deaths than the last, and that November is the most favorable, whereas January and April are the most unfavorable.

Humidity is only a secondary factor to these three, because it is dependent upon the direction of the wind. NNE. to E. winds are dry winds, and since there is an increase in the number of deaths following these winds, it may be said that the dry air is not favorable, a fact which does not justify the good reputation, as the author says, of the *petit froid sec*.¹

The details of the study, of which this note is a summary, will be published later elsewhere.—C. L. M.

COLDS AND THEIR RELATION TO THE PHYSICS OF THE ATMOSPHERE.

By C. M. RICHTER, M. D.

[Author's conclusions reprinted from the *Medical Record*, New York, Dec. 6, 1913.

1. Acute coryza, commonly called a "cold," depends for its development primarily on an excess of moisture in the air we inhale.

2. It develops, therefore, principally during the cyclonic weather condition called a LOW, especially when a period of very dry weather has preceded a LOW and when, in consequence, the change from previous dry air to the incoming very moist air is most rapid.

3. The excessive and more or less continuous nasal secretion at the beginning of an acute coryza relieves the respiratory apparatus from the otherwise damaging effect of an overcharge of moisture.

4. A child's nasal mucosa and the hyperesthetic one are especially prone to suffer.

5. The "running of the nose" constitutes in part a physiological vasomotor action analogous to the profuse and more or less continuous perspiration of the outer skin, which sets in whenever air temperature and relative humidity transgresses certain limits and which forces thereby better conditions for evaporation.

6. Latent microbism becomes active on the mucosa only after these air conditions have favored its development for some time. Microbism is very rarely the primary cause of an acute coryza.

NOTE ON TWO EARLY PAPERS ON THE PATHOLOGICAL ASPECTS OF CLIMATE.

Dr. I. M. Cline, who was for over ten years professor of climatology in the University of Texas and connected during that time with the United States Weather Bureau, and now in charge of the United States Weather Bureau station in New Orleans, La., made two contributions to the climatology of Texas based on over twenty years' records of Galveston, Houston, and other places.* These papers were read before the Texas State Medical Association in 1895 and 1896 and were entitled "The Climatic Causation of Disease with a Chart Showing the Pathological Distribution of Climate in the United

¹ M. Th. Tommasina (*Comptes Rendus*, Nov. 8, 1920, p. 939-949) takes exception to the author's conclusion, which, he says, is based upon a statistical study which was not adequate, owing to the peculiarities of diseases of the respiratory organs.

*In "The Monthly Bulletin of the Texas Weather Service," November, 1890, to October, 1891, Dr. Cline published studies on the comparison of daily mean temperature change, and departures from normal with the daily mortality from several diseases in Galveston, Tex. His data covered the years 1875-1889, inclusive. Similar studies, Dr. Cline believes, should be made in various parts of the country, thus affording a medical climatological survey which would be of great assistance to the physician in selecting the proper climate for his patient.—EDITOR.

States"¹ and "Influences of Climatic Conditions and Weather Changes in the Functions of the Skin."²

Dr. Cline undertook to investigate the relation between the causation and fatality of certain diseases and weather changes which take place from day to day, as these appear of greater importance than the seasonal changes on account of their suddenness and frequency which shock the system even when in health. Sudden weather changes are unfavorable to the successful treatment of most diseases, but in a few diseases certain changes prove favorable. Decided change in temperature excites the nerve centers and in exciting the vasomotor center disturbs the vascular system and causes the capillary vessels to become gorged and paralyzed, which is a cause for inflammation in the affected parts. The effect is pronounced in decided falls in temperature in localities where there is a large diurnal range and where there is a wide difference between sun and shade temperature. Dr. Cline discusses the whole question of the adjustment of the human organism to these various changes and the possible occurrence of local or general congestion.

Dr. Cline furnishes an interesting problem in discussing the relation between inspired and expired air and the state of the bronchial mucous membrane. The quantity of water given off from the system in the form of vapor in excess of that received during respiration depends almost entirely upon the temperature of the air inhaled. Assuming that the air leaves the body at a temperature of 98.5° F. and saturated with moisture, it would carry off from the lungs of a person of average size in one day 6,636 grains of water in the form of vapor. In localities, for example, having an average mean daily temperature of 32° F. during the winter and the average relative humidity 75 per cent, each cubic foot of air would contain about 5.1 grains of vapor of water. The amount of water taken into the lungs by respiration during 24 hours under these conditions would be 1,785 grains; while the amount exhaled, 6,636 grains, shows an excess of water given off from the system through respiration over that received amounting to 4,851 grains daily. The excess becomes greater as the temperature goes lower and less as it rises, while the per cent of moisture remains constant. To furnish the complement of water between the amount inhaled and that exhaled rapid evaporation takes place from the lining mucous membrane of the air passages and air cells of the lungs wherever such weather prevails.

The fluids from the pulmonary circulation which normally keep the lining membrane of the lungs moist contain more or less of the nonvolatile salts carried in solution in the blood.

An interesting conclusion by Dr. Cline follows: These salts are left as a deposit from the water carried out of the lungs during respiration in quantities depending upon the amount of salts in the blood at the time and the extent of the evaporation which takes place. He claims and cites authorities to show albumen will not pass through an animal membrane toward pure water, while it will pass to a solution of salt, and that the more rapid the movement of the fluid the greater is the amount of albumen which passes through to the salt solution. Hence an excess of saline solution on the mucous lining of the lungs favors the exudation of albumen into the

air passages and air cells. Dr. Cline believes that this condition favors pulmonary disease in affording lodgment and a favorable environment for the growth of pathogenic organisms. Against such a theory it may be urged that whatever tendency there may be toward a concentration of salt in the lining membrane of the air passages would be met by diffusion or osmosis so as to preserve an equilibrium. Any momentary change would be quickly restored by the vast reserve in the general blood-supply.

Albuminous substances may pass through an animal membrane if the salt concentration is sufficient to injure it; but it should be remembered that the common method of separating albuminous substances in solution from salts is by dialysis.³—Guy Hinsdale.

AUTHOR'S NOTES.

Notwithstanding Dr. Hinsdale's statements of conditions which appear against my theory regarding lung diseases, I believe that further research dealing directly with the human organism will substantiate the conclusions I have reached.

When the physical organism is normal in all respects the vast reserve in the general blood supply no doubt would quickly overcome momentary changes and prevent the formation of conditions in the lungs favorable for the lodgment and development of disease germs. However, when an individual is somewhat indisposed, as is frequently the case, the human organism does not function as nature intended and it is then that conditions develop in the lungs which favor pulmonary disease in affording lodgment and favorable environment for the growth of pathogenic organisms.—I. M. Cline.

THE INFLUENCE OF INFINITESIMAL TRACES OF NUTRITIVE SUBSTANCE IN THE HUMIDITY OF THE AIR UPON CONTAGION.

By A. TRILLAT.

[Abstracted from *Comptes Rendus*, Paris Academy of Sciences, t. 171, pp. 282-284, July 26, 1920.]

The author, having previously shown (*C. R.*, 170, 1529, 1920) that the mortality among mice exposed to contagion is much greater if the surrounding air is saturated at the time of exposure than if it is dry, has now repeated his former experiments, introducing into the humid air 1/1,500,000 part by volume of ordinary bouillon. Numerous experiments confirm the fact that the favorable influence of humidity upon the spread of contagion is markedly augmented by the presence of infinitesimal traces of such nutritive substance. It has been shown before (*C. R.*, 155, 1184, 1912) that the vitality of microbes in suspension in the atmosphere is extraordinarily sensitive to physical and chemical agents.

Now, in nature the humid atmosphere is rarely pure—there are present respired gases, and emanations from the soil, all containing solid matter in suspension. It is especially important in practical hygiene to get rid of all respired air, since the humidity and nutritive substance contained therein is highly favorable for the rapid multiplication of microbes and the ready spread of contagion.¹—E. W. W.

¹ Galveston, Tex., 1895, 23 pp.
² Galveston, Tex., 1896, 8 pp.

³ Cf. Hinsdale, Guy: Atmospheric Humidity, *Bull. of the Medico-Chirurgical College of Philadelphia*, 1911, pp. 1-5.

⁴ Cf. MONTHLY WEATHER REVIEW, May, 1920, 48; 284.